

### **REMARKS**

This responds to the Office Action mailed on April 19, 2005, and further to the Advisory Action mailed July 14, 2005.

No claims are amended, no claims are canceled, and no claims are added; as a result, claims 1-34 are now pending in this application. Applicant respectfully requests reconsideration of the above-identified application in view of the remarks that follow.

Applicant respectfully requests a telephonic interview with the Examiner prior to taking action on the instant response.

#### **Response to the Advisory Action**

In the Advisory Action, it is stated that “Bojarczuk teaches identical invention since the method is applicable to Pr.” Applicant disagrees. Bojarczuk deals with a method of bombarding a surface with a metal and oxygen to form a metal oxide, in which Bojarczuk indicates that Pr may be used. However, Applicant cannot find in Bojarczuk a disclosure, a teaching, or a suggestion regarding an interface between a praseodymium oxide and a surface of a body region on which a praseodymium oxide is disposed as recited in the instant claims. In an example of Bojarczuk’s method applied to aluminum the interface between the oxide and the Si substrate was reported to be free of any interfacial layers as deduced from high resolution transmission electron microscopy. *See, Bojarczuk column 3, lines 55-67.* Applicant cannot find in Bojarczuk in a disclosure, a teaching, or a suggestion that Bojarczuk’s method applied to Pr, or any other listed metal other than Al, will also result in an oxide of Pr or the metal without an interface layer. Though Bojarczuk’s method is applicable to Pr to form an oxide, Applicant cannot find in Bojarczuk a disclosure, a teaching or a suggestion that the results for aluminum, in addition to forming an oxide, will be the same for all the other listed materials. Listing a set of elements to be used in a method to form an oxide does not disclose, teach, or suggest that all the listed elements are equivalent and have additional characteristics other than having an oxide formed by the method. Applicant respectfully requests that the Examiner specifically show where in Bojarczuk it is demonstrated that additional characteristic associated with the formed aluminum will also occur in the formation of the other listed elements.

Further, Applicant submits that the Office Actions of record have not provided objective evidence or references to support the proposition that ancillary results to one material, aluminum in the case of Bojarczuk, in a list of materials on which a method of a patent may be practiced will result in the same ancillary results to other elements in the list of materials, where the patent is silent on the ancillary results in the general case. Without such objective evidence or references, Applicant submits that rejections based on a patent silent with respect to features of claims of an application are not proper.

In the Advisory Action, referring to Bojarczuk, it is stated that “[i]nterface material will not grow between praseodymium oxide and the body regions because the oxide deposition is carried out below room temperature (see column 2, lines 14-16).” Bojarczuk at column 2, lines 12-17 recites “[s]ince highly reactive oxygen can be used as a source material, an elevated temperature is not necessary for oxidation, and the oxide deposition may be carried out to temperatures below room temperature, (less than about 30 °C up to about 1000° C). This is an advantage of the technique.” Applicant cannot find in the section of Bojarczuk, referenced in the Advisory Action, a disclosure, a teaching, or a suggestion that interface material will not grow between praseodymium oxide and the body regions because the oxide deposition is carried out below room temperature, as stated in the Advisory Action. Further, column 2, lines 17-20 indicate that the method may be used to provide beams of oxygen to a silicon substrate to form interfacial silicon dioxide. Thus, Bojarczuk appears to contradict the above quoted statement in the Advisory Action.

Further, Applicant cannot find in the Office Actions of record objective evidence or cited references to support the above quoted statement from the Advisory Action. Applicant requests that objective evidence or references be provided by the Examiner to support the above quoted statement from the Advisory Action. Absent a reference, since such a statement would be from the Examiner’s personal knowledge, the Examiner is respectfully requested to submit an affidavit in support of his proposition in the Advisory Action.

In view of these remarks, Applicant respectfully requests withdrawal of rejections of claims 1-34, and reconsideration and allowance of these claims.

§102 Rejection of the Claims

Claims 14-18 were rejected under 35 U.S.C. § 102(e) for anticipation by Bojarczuk (U.S. 6,541,079) in view of Osten (US 2003/0193061). Applicant traverses these grounds of rejection of these claims.

Applicant reserves the right to swear behind Bojarczuk and Osten at a later date.

Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ 2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). Therefore, Applicant submits that these rejections under 35 U.S.C. § 102(e) for anticipation by Bojarczuk in view of Osten are not proper. Since these rejections are not proper under 35 U.S.C. § 102(e), Applicant respectfully requests that the finality of the rejections in the Office Action be removed.

Further, Applicant cannot find in Osten a disclosure, a teaching, or a suggestion of a transistor including a praseodymium oxide dielectric layer on a body region, where the praseodymium oxide contacts the body region substantially without an interface material between the praseodymium oxide and the body region, as recited in claim 14. Applicant submits that Osten's discussion of crystalline praseodymium oxide in a transistor is provided in paragraph [0056], where Osten discusses a transistor having a praseodymium oxide layer with an interface including a silicate. Osten's transistor in this discussion has a praseodymium oxide dielectric layer and an interface that is "less than 20%" of the transistor's gate oxide layer, where the interface includes a silicate. Thus, Osten appears to teach away from the features recited in instant claim 14. Thus, Applicant submits that Osten does not anticipate claim 14.

Claims 15 -18 depend on claim 14 and are patentable over Osten for at least the reasons stated above with respect to claim 14.

Additionally, Applicant cannot find in Bojarczuk a disclosure, a teaching, or a suggestion of a transistor including a praseodymium oxide dielectric layer on a body region, where the praseodymium oxide contacts the body region substantially without an interface material between the praseodymium oxide and the body region, as recited in claim 14. Bojarczuk deals with producing layers of metal oxides by a method that uses a reactive atomic or molecular beam concurrent oxidation and deposition. *See, Bojarczuk Summary, column 1, line 66 – column 2,*

line 3. In addition, Bojarczuk lists a number of elements that are bombarded onto a substrate while oxygen is being bombardment on the substrate to form an oxide or oxynitride. *See, Bojarczuk Summary, column 1, line 18 – column 1, line 30.* Bojarczuk's list includes Pr. However, Applicant cannot find in Bojarczuk further discussion of Pr. Subsequent to providing this list, Bojarczuk discusses forming aluminum oxide where "[t]he interface between the oxide and the Si was free of any interfacial layers as deduced from high resolution transmission electron microscopy." Applicant submits that forming aluminum oxide such that an interface between the aluminum oxide and the Si is free of any interfacial layers does not disclose, teach, or suggest a praseodymium oxide dielectric layer that contacts a body region substantially without an interface material between the praseodymium oxide and the body region. In the Summary (column 3, lines 1-6) and in closing remarks (column 4, lines 60-65) Bojarczuk recites: "it will be understood that various omissions and substitutions and changes in the form and details of the method and apparatus illustrated, and in their operation, may be made by those skilled in the art without departing from the spirit of the invention." Applicant cannot find in Bojarczuk a discussion regarding which substitutions belong to which changes in details of the method. Therefore, Applicant cannot find in Bojarczuk a disclosure, a teaching, or a suggestion of a Pr oxide layer on Si such that an interface between the Pr oxide and the Si is free of any interfacial layers. Applicant submits that Bojarczuk does not teach the identical invention in as complete detail as is contained the claim. "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP § 2131. Thus, Applicant submits that Bojarczuk does not anticipate claim 14 and that claim 14 is patentable over Bojarczuk.

Claims 15 -18 depend on claim 14 and are patentable over Bojarczuk for at least the reasons stated above with respect to claim 14.

Applicant respectfully requests withdrawal of these rejections of claims 14-18, and reconsideration and allowance of these claims.

*First §103 Rejection of the Claims*

Claims 1-13 and 19-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bojarczuk in view of Osten, Wilk (U.S. 6,258,637), and Borden (U.S. 6,154,280).

Applicant traverses these rejections of the claims.

Applicant cannot find in the combination of Bojarczuk, Osten, Wilk, and Borden a teaching or a suggestion of a praseodymium oxide dielectric layer on a surface portion of a body region, where the praseodymium oxide contacts the surface portion substantially without an interface material between the praseodymium oxide and the surface portion as recited in claim 1. As discussed above, Applicant cannot find in Bojarczuk or in Osten a teaching or a suggestion of a praseodymium oxide dielectric layer on a surface portion of a body region, where the praseodymium oxide contacts the surface portion substantially without an interface material between the praseodymium oxide and the surface portion as recited in claim 1. Also, Applicant submits that Wilk and Borden do not cure the deficiencies in citing Bojarczuk and Osten with respect to claim 1. Thus, Applicant submits that Bojarczuk in view of Osten, Wilk, and Borden does not teach or suggest all the elements of claim 1, and that claim 1 is patentable over Bojarczuk in view of Osten, Wilk, and Borden.

Further, Applicant cannot find in the combination of Bojarczuk, Osten, Wilk, and Borden a teaching or a disclosure of a praseodymium oxide dielectric layer on a surface portion of a body region, where the praseodymium oxide contacts the surface portion substantially without an interface material between the praseodymium oxide and the surface portion, where the body region has a surface roughness of approximately 0.6 nm as recited in claim 1. In the Office Action, it is stated:

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Bojarczuk and provide a surface portion of the body region that has a surface roughness to approximately 0.6 nm for the benefit of providing high device reliability and performance as taught by Wilk in column 1, lines 50-52 and also for the benefit of the transistor being capable of withstanding higher electric fields as taught by Borden in column 4, lines 29-40.

Applicant respectfully disagrees. In the section of Bojarczuk including column 14, lines 15-17, cited in the Office Action, Bojarczuk discusses a surface roughness associated with a SiO<sub>x</sub> interface layer. Further, Applicant cannot find a teaching or a suggestion in

the combination of Bojarczuk, Osten, Wilk, and Borden that provides a reasonable expectation that the combination of these references would lead to a praseodymium oxide dielectric layer on a surface where the praseodymium oxide contacts the surface substantially without an interface material and where the surface has a roughness of approximately 0.6 nm. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP § 2143.

Applicant submits that, for at least the reasons stated above, claim 1 is patentable over Bojarczuk in view of Osten, Wilk, and Borden. Applicant further submits that independent claims 7, 11, 19, and 23 are patentable over Bojarczuk in view of Osten, Wilk, and Borden for at least the reasons discussed above with respect to claim 1. Claims 2-6, claims 8-10, claims 20-22, and claims 24-26 depend on claims 1, 7, 11, 19, and 23, respectively, and are patentable over Osten in view of Wilk and Borden for at least the reasons discussed herein.

Applicant requests withdrawal of these rejections of claims 1-13 and 19-26, and reconsideration and allowance of these claims.

#### *Second §103 Rejection of the Claims*

Claims 27-34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bojarczuk in view of Osten, Wilk, Borden, and the Admitted Prior Art. Applicant traverses these rejections of the claims.

Applicant submits that independent claims 27 and 31 are patentable over Bojarczuk in view of Osten, Wilk, Borden, and the alleged Admitted Prior Art for at least the reasons discussed above with respect to claim 1. Claims 28-30 and claims 32-34 are dependent on claims 27 and 31, respectively, and are patentable for at least the reasons stated above with respect to claims 27 and 31.

Applicant respectfully requests withdrawal of these rejections of claims 27-34, and reconsideration and allowance of these claims.

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 371-2157 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

KIE Y. AHN ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 371-2157

Date

19 July 2005

By

David R. Cochran

David R. Cochran

Reg. No. 46,632

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop RCE, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 19 day of July, 2005.

KACIA LEE

Name

Kacia Lee

Signature